

B. Specification

Please amend the paragraphs at page 1, line 12 - page 2, line 14, as follows:

--Foam ~~foaming~~ forming has a long history. For example, techniques of obtaining resin foamed products by injection foaming are disclosed in U.S. Pat. Nos. 3,268,639 and 3,384,691. In recent years, methods of foam ~~foaming~~ forming using chemical foaming agents or physical foaming agents are described in ~~textbooks of synthetic resin foaming~~ textbooks.

~~Lately~~ Recently, a method ~~of foaming~~ and an apparatus for forming a very small foam called a microcell ~~is found in~~ was described by the Massachusetts Institute of Technology, U.S.A., ~~This method and an apparatus for the method are disclosed~~ in U.S. Pat. Nos. 4,473,665, 5,158,986, 5,160,674, 5,334,356, 5,571,848, and 5,866,053. In the method and apparatus proposed ~~[[in]]~~ by the Massachusetts Institute of Technology, U.S.A., a supercritical inert gas is blown into a portion where a resin is melted in a plasticator of an injection foaming machine, and the well-melted resin and the gas are mixed by a static mixer. It was reported that when the pressure and temperature were controlled, a large number of cells of 25 μm or less were evenly dispersed in the ~~foamed~~ formed foamed product, and the foamed product had almost no strength deterioration since the cell size was small. The above references also describe a method by which a resin material is placed in a pressure vessel, a supercritical inert gas is allowed to saturate into the resin material, and the resin is foamed by abruptly reducing the pressure at a temperature near the melting temperature of the resin, and a method by which the resin is foamed by abruptly raising the temperature after the temperature and pressure are once lowered.--

Please amend the paragraph at page 2, line 21 - page 3, line 8, as follows:

--That is, the conventional foam ~~foaming~~ forming is roughly classified [[into]] as chemical foaming and physical foaming. The chemical foaming includes a master batch method in which a foaming agent, which causes a chemical reaction by heat and a resin material are mixed in the form of pellets, and a method in which the foaming agent is kneaded in a resin material. The physical foaming includes a method in which an inert gas is allowed to directly saturate into a molten resin from a plasticator of an injection foaming machine or extruder, and a batch method in which an inert gas is allowed to saturate into a previously foamed and shaped resin product at a high temperature and high pressure, and the resultant material is foamed in a pressure vessel by abruptly changing the temperature or pressure.--

Please amend the paragraphs at page 4, line 9 - page 5, line 22, as follows:

--Furthermore, to compensate for this drawback, it is possible to raise the pressure together with the gas temperature, and blow the gas into the molten resin while the gas concentration is maintained. In this method, however, the gas pressure is very high, and the gas flows into the molten resin at the moment when the gas is blown into it. This makes it difficult to control the gas blowing amount, and increases variations in the amount of the gas, which saturates into the resin. Also, since the gas is abruptly blown into the molten resin, the molten resin forms two separated layers of the gas and resin near the blowing port. [[To]] Therefore, to evenly disperse the gas in the resin, ~~therefore,~~ it is necessary to mechanically repeat the kneading by using a static mixer or the like, and encourage dissolution of the gas into the resin by raising the pressure of the resin-gas

mixture itself. This complicates the apparatus, and variations in gas saturation amount in the material vary the dimensional accuracy of the foamed product and deteriorate the product quality. In addition, the long cycle ~~deteriorates~~ reduces the productivity.

The batch method using an inert gas eliminates both the drawbacks of the chemical foaming and the drawbacks of the physical foaming by which a gas is directly blown into a molten resin. However, since this batch method is an intermittent production method using batch processing, the productivity is significantly ~~worsens~~ reduced.

A method, such as the one described in Japanese Patent Laid-Open No. 8-85128, in which a gas is allowed to saturate into a resin material by the batch method and then the material is continuously foamed by an injection foaming machine, compensates for the above-mentioned drawbacks. However, the amount of the gas which saturates into a solid resin material, such as pellets, changes in accordance with the gas pressure, temperature, and time. Accordingly, if the foaming cycle or gas saturation time changes even slightly, the amount of the gas which saturates into a resin material changes. Since this changes the foamed state of the foamed product, the accuracy also changes.--

Please amend the paragraph at page 5, line 25 - page 6, line 1, as follows:

--The present invention, therefore, has been made in consideration of the above situation, and ~~has as its~~ an object thereof is to obtain a high-accuracy foamed product with high productivity.--

Please amend the paragraphs at page 6, line 12 - page 7, line 11, as follows:

--According to a second aspect of the present invention, there is provided a method of storing a material into which a gas saturates, wherein a gas is allowed to saturate into a resin material at a saturation pressure P (MPa) of 4 (MPa) or more and a temperature T ($^{\circ}\text{C}$), and, letting m ($-0.05 < m < 0.2$) be a coefficient determined by a material type and a gas saturation time t , The material is stored in an ambient defined by a pressure p (MPa) represented by $p = P(0.02P + m)$ and a temperature t represented by $0.1875T - 10 < t < 0.5T - 10$, where $20^{\circ}\text{C} \leq T \leq 60^{\circ}\text{C}$, and represented by $0.1875T - 10 < t \leq 20^{\circ}\text{C}$, where $T > 60^{\circ}\text{C}$.

According to a third aspect of the present invention, there is provided a method of storing a material into which a gas saturates, wherein 0.1 to 1.5 wt % of supercritical carbon dioxide ~~is~~ allowed to saturate into a pelletized solid resin material, and the solid resin material is stored at a temperature lower than a gas temperature when the carbon dioxide saturates, and at a high gas density.

According to a fourth aspect of the present invention, there is provided a method of storing a material into which a gas saturates, wherein 0.1 to 1.5 wt % of supercritical carbon dioxide at a gas density of 0.08 to 0.2 g/cm^3 ~~is~~ allowed to saturate into a pelletized solid resin material, and the solid resin material is stored at a gas density of 0.7 to 1.0 g/cm^3 --

Please amend the paragraphs at page 8, lines 9-16, as follows:

--Fig. 5 is a view showing the foamed state of the section of a foamed product obtained by injection foaming after being stored for 1 hr by a storage method of this embodiment;

Fig. 6 is a view showing the foamed state of the section of a foamed product obtained by injection foaming after being left to stand for 1 hr without using the present invention;--

Please amend the paragraph at page 10, lines 15-19, as follows:

--The storage time and weight change in Fig. 7 indicate that a change in the amount of the gas which saturated into the resin material was 1% or less even after the storage time elapsed, i.e., there was almost no change in gas amount.--

Please amend the paragraphs at page 11, line 20 - page 12, line 6, as follows:

--Alternatively, 0.1 to 1.5 wt % of supercritical carbon dioxide at a gas density of 0.08 to 0.2 g/cm² ~~[[are]]~~ is allowed to saturate into a pelletized solid resin material, and the solid resin material is stored at a gas density of 0.7 to 1.0 g/cm².

Fig. 5 shows the foamed state of the section of a foamed product obtained by injection foaming after being stored for 1 hr by the control method of this example.

--Fig. 6 shows the foamed state of the section of a foamed product obtained by injection foaming after being left to stand for 1 hr without using the present invention. It is readily understood from comparison of Figs. 5 and 6 that the control method of this example is very effective in maintaining the foamed state.--

Please amend the paragraphs at page 12, line 11 - page 13, line 13, as

follows:

--~~Resin materials~~ There were six types of resin materials, i.e., high-impact polystyrene (HIPS), an alloy material (PC/ABS) of polycarbonate and acrylonitrile-butadiene-styrene, polyphenylene ether (PPE), a resin (PPE+GF) formed by filling polyphenylene ether with a glass filler, a resin (PPE+PS) formed by mixing a glass filler in an alloy of polyphenylene ether and polystyrene, and polycarbonate (PC). Carbon dioxide was used as an inert gas ~~[[as]]~~ and a foaming gas. Fig. 8 shows the saturation pressure, saturation temperature, and saturation time by which the carbon dioxide was allowed to saturate into the resin material, and also shows the storage pressure and storage temperature of this example.

The storage time and weight change shown in Fig. 8 reveal that when the storage pressure and storage temperature were adjusted within the range of this example by the resin material and saturation time, a change in the amount of the gas which saturated into the resin material ~~[[was]]~~ decreased to 1% or less even when the storage time elapsed.

Fig. 3 shows changes in weights of HIPS materials at atmospheric pressure and room temperature after an inert gas was allowed to saturate into the materials by the conventional method. For ~~the sake of convenience of~~ a more convenient measurement, a point five minutes after gas saturation is set to 0. As shown in Fig. 3, at any saturation pressure and any temperature, the gas escaped from the material with time.--

Please amend the paragraph at page 15, lines 3-7, as follows:

--In the above embodiment, foam ~~foaming~~ forming of resin materials is explained. However, the present invention is, of course, applicable not only to resin materials, but is also applicable to rubber materials and so-called polymer materials.--